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CHAPTER 17

# Russian Experience in Information Technology Cooperation with Two Koreas: Lessons and Prospects

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## Introduction

$\mathcal{R}$ussia has had a rather late start in the development of information technologies due to a negative bias in the Soviet R&D policy.  But, these days the information technology revolution is quickly picking up steam across the Russian Federation.  Solid fundamental education, based on centuries-old traditions of the Russian classic school and the Soviet-era emphasis on natural sciences, constitute a good *milieu* for emergence of a vast number of qualified and outstanding computer scientists and practitioners.  Specifically, the demand for modern technologies by the Soviet military-industrial complex, which competed against the United States for the first place in the world at the height of Cold War, led to the creation of a system of recruitment of talented personnel and the

organization of military-oriented research that had an extraordinary potential and produced magnificent results.

Not everything has been lost in the difficult period of reforms. As the pace of economic recovery and reforms quickened and the affluence of the general public began to increase, the Russian government began to place greater emphasis on information technologies. Consequently, increasing market and government-generated demand for new IT-related products and services resulted in exponential growth of the IT sector in modern Russia.

## Moscow and Seoul: In Search of Mutual Benefit

Russia has a world-renowned potential in the development of new computer software and hardware, communication equipment, new materials for electronic industry, neuro-computers, crystallography, and lasers. It is that potential that attracted the attention of Korean research centers and IT-related companies from the very beginning of full diplomatic and economic relations between the Russian Federation and the Republic of Korea in the early 1990s. It is noteworthy that some ROK companies revealed considerable interest in the Russian high-tech sector even in the late 1980-s, when no official relations existed between the two countries. Numerous South Korean "market exploration missions" coming to Russia at that time were interested basically in two things: resources and high technologies. Such keen interest in Russian scientific expertise was and is understandable. According to South Korea's own estimates, the level of development of four leading technologies of the future – biotechnology, nanotechnology, space technology and ecological technology – ranges from 26% to 66 % off the level of advanced industrial economies of the West.

After diplomatic relations between Moscow and Seoul were established in 1990, their cooperation in science and technology became very active.   In fact, one of the first agreements signed between the two governments in December 1990 dealt with technological and scientific cooperation.

In accordance with that agreement, the two governments established a special bilateral mechanism of technological cooperation.  It includes the Russian-ROK Joint Committee on Science and Technology Cooperation, which meets annually and is supposed to draft and adopt bilateral programs of joint scientific and technological research. Under these programs more than 60 projects have already been carried out.

Available data indicate that every one in four joint research projects between Russian and Korean companies may be considered IT-related. This is quite significant, taking into account the fact that the level of development of IT in Korea is believed to be about 75% of the level of developed countries. The Russian-Korean projects in IT are centered mostly on basic research in the most advanced areas of IT, the results of which constitute the foundation for the next-generation Korean IT products and services.  Korean industry is well equipped to commercialize the discoveries and outputs of Russian basic science s and their achievements in the development of technology know-how to the benefit of both countries.

For example, the Korean Atomic Energy Research Institute together with its Russian counterpart developed a technology of ion implantation for commercial usage. Under the same arrangement, the Korean Institute of Science and Technology Information developed a technology for the manufacturing of industrial ceramics.

The Korean Electrical Technology Research Institute used a Russian technology for the manufacturing of measurement and control electro-optical instruments used in the IT industry. The Chungam National University and its Russian academic partner jointly developed a technology for the manufacturing of super-pure silicon for semiconductors using SHS-process. The Korean Advanced Institute of Science and Technology introduced the Russian system of high-precision positioning for semiconductor photolithography. Russian experts consider the prospects for cooperation with Korea in the development of software and computer equipment to be quite promising.

In the middle of the 1990s, the Russian and Korean governments established a new channel for Korean companies to acquire Russian technologies, including IT-related ones, in the form of joint Russian-Korean research centers on the basis of the most advanced Russian hard science institutions in Moscow, Saint Petersburg, and Khabarovsk, such as the Kurchatov Nuclear Physics Institute, the Vavilov Institute, VILS, the Central Institute of Aviation Machinery, and so on. The Korean government finances these joint R&D centers. They provide Korean researchers with a unique opportunity not only to share in their research results but also to learn the scientific methodology and know-how from their Russian counterparts. In a related development, a center for the exchange of scientific information is being created under the auspices of the KISTI and the Russian Center of Science Statistics and Research. This joint center is designed to facilitate an exchange of R&D information between the two countries.

In 1999, Moscow and Seoul established the Russian-Korean Committee on industrial cooperation, which is

expected to facilitate sector-specific exchanges of data and information in aerospace technology, machine-building, and new materials, with some aspects of these exchanges being relevant to IT, of course.   That committee specifically deals within the transfer of technology and know-how from the Russian military industrial complex to its Korean counterparts.   The Korean side was offered several projects on licensed production of hi-tech equipment and machinery, as well as an opportunity for the education of Korean technicians in Russia.

It is worth mentioning that the breakup of the old Soviet-era system of R&D management and virtual absence of a new one in Russia created confusion and even chaos in the 1990s, which resulted in the emergence of illegal and semi-legal technology transfer channels. This was misfortunate for the Russian State, but it was hardly an avoidable phenomenon.  It is true that at present, the national system of commercialization of R&D results is de facto absent in Russia.   It is also true that when a country lacks professional management in science, as well as sound and respected legal foundations for technology transfer and exports, then centralized innovation policies are in fact ineffective.

The ROK science and technology-related agencies and private companies have been using and often abusing that Russian predicament to their advantage -- trying to seize dominant positions in the most promising sectors and to get the valuable scientific information and data without due compensation and on an non-equivalent basis.   The situation is aggravated by the South Korean government's persistent refusal to sign an agreement on the protection of intellectual property rights, proposed by Russia. This has become a serious obstacle in the development of civilized

forms of technology cooperation and technology transfer between Russia and the Republic of Korea.

South Korean science and technology-related agencies and companies are widely known to be frequently relying on the so-called "gray" schemes for sensitive technology transfers out of Russia throughout the 1990s. They used direct unauthorized and unsupervised contacts with Russian research centers and many leading scientists to gain access to dual-use technologies in violation of the Russian laws or to get the desirable R&D results for a fraction of the market price. In plain English, it is called industrial espionage and unfair competition.

Korean private companies and government agencies recruited many Russian scientists who had access to the development of military-sensitive technologies to work in the R&D sector in Korea on the basis of private contracts without prior notification or authorization of the Russian government. The ROK government is reported to have instituted and funded a comprehensive program to attract Russian scientists for one- to three-year jobs in Korean scientific research institutes. At present, only 70-80 researchers are reported to work in the ROK under this arrangement. At the same time, the total number of Russian scientists permanently working in Korean centers of advanced sciences is estimated to exceed 450. They work at both state -- run research centers (for example, the KIST, KAIST, KAERI, KRISS, KARI, KETRI, KIMM), leading national universities, and private companies like Samsung and LG research centers. Since many contracts contain a confidentiality clause, these scientists are prohibited to disclose the nature of their work; therefore, no data is available on the exact portion of IT-related research, but one can guess it is quite significant. Russian scientists are known to constitute the core group of research efforts of

LG and Samsung, which are proud of their advanced positions in the IT sector of the world. The Russian government feels the need to increase transparency in that type of bilateral cooperation in order to preserve Russia's national security and commercial interests and to establish a solid foundation for trouble-free, mutually-advantageous scientific cooperation.

Russian experts view the current situation in the ROK IT market and the prospects of its development as very promising for bilateral cooperation. These days, IT-related industries account for about 14% of ROK GNP and about 30% of its exports with a tendency to grow even more. In 2001, the ROK government designated six strategic areas of technological development in the 21st century, with IT being given priority in twelve themes. These include post-PC technologies, speech information technologies, digital testing machines, organic electro-luminescent devices, personal robots, and others. The ROK government will allocate US$ 107 million up to the year of 2011 to support the basic research in these areas. Specifically, post-PC technology development is scheduled to receive both from government and private sources (up to the year of 2006) US$ 38M, SIT – US$ 17M, digital testing equipment – US$ 11.2M, personal robots – US$ 52M, electro-luminescent monitors – 20M. The ROK Ministry of Information and Communications allocated additional US$ 40 million in 2002 to support venture companies in the IT sector. Russian scientists and technology-development agencies are very eager to get a share of the IT pie in the ROK.

The ROK also plans to train about 430,000 specialists for hi-tech field, including IT. Russia could offer education at a high level and modest price, compared to Western universities.

The ROK government has introduced "science card visa system" for foreign scientists to more easily come to Korea for up to 3 years, and allocated funds for national universities to invite foreign professors.  Both measures would encourage the increased inflow of Russian scientists to South Korea.

Generally speaking, bearing in mind the growing significance of the Russian market for Korean IT products, especially mobile phones and computers, the IT field can be considered as one of the mutually complimentary spheres of the Russian-ROK bilateral cooperation.  The fact that IT-sector cooperation is based on intellectual resources, as opposed to natural resource-based cooperation, is of special significance for Russia, because it falls well into the overall Russian strategy of international division of labor in globalization era.

**Moscow and Pyongyang: Moderate Hopes, Little Action**

From a strategic point of view, Russian cooperation with the DPRK, although incomparable by volume and in commercial terms with its cooperation with the ROK, is also quite significant.  North Korea sees IT as one of the priority areas that could bring much benefit to the country in the absence of resources and faltering "traditional" industries by using its intellectual potential and the graduates of its considerably advanced system of higher and special education.   One can note that the organization and management of professional education and R&D in the DPRK are modeled after the Soviet system with comparably greater emphasis on technical training and basic sciences (using much of Russian technical and scientific literature).   Hence, it has similar merits and

shortcomings. That also creates many opportunities for bilateral cooperation.

The DPRK supreme leader, Kim Jong Il, is known to be very keen on IT, likes to browse the Internet personally, and promotes the use of IT in daily activities of his government, especially by his "inner circle." For example, long before the cellular phone commercial system was introduced in DPRK, the high-ranking cadres of the Workers' Party of Korea (WPK) in Pyongyang used a limited-access trunk system of their own. They also rely on modern information technologies in international communication.

These days, the DPRK leadership emphasizes the following directions of IT development in the country:

- Introduction of computers at production facilities, state management bodies, and educational facilities;

- Training in IT and computers through general and professional education systems and at the enterprises;

- Development of local, customized software and local production of computer hardware and IT equipment;

- Greater international cooperation in the IT sector, with special emphasis on "processing for commission" in IT hardware manufacturing.

Recently, the DPRK government installed desktop computers and fully computerized the offices of the Ministry of Railroads, the Ministry of Labor, Ministry of Timber Industry, Center for Earthquake Forecasting,

Committee for Natural Resources, Tanchon Magnesia Clinker Combine, Nampo Port. The Loxley Pacific Group of Thailand and its North Korean partner established an international telecommunication center in the Rajin-Sonbong Free Economic Zone. The government launched a comprehensive program to build a nationwide Internet network. In the late 1990s, the government developed a national intranet named "Kwangmyong," connecting the Palace of Peoples' Studies in the capital, Pyongyang Information Center, Agency for Science and Technology, many research institutes, universities, and industrial enterprises across the country. The "Kwangmyong" intranet has about two million subscribers and a database of about ten million entries.

The IT and computer specialists are trained at the Korean Computer Center, the Agency for Science and Technology, the Center of Computer Education of the Ministry of Education, and the Directorate for Extracurricular Studies of the Kim Il Sung Youth Union. More than 4,000 IT specialists have graduated from the Pyongyang College of Computer Technologies since its establishment in 1985. In 2002, more than 500 North Korean IT specialists are said to receive their training at various universities, research centers, and companies in Europe.

Recently, North Korea has succeeded in developing its own software for computerized translation, TV subtitles, and fingerprint identification. The North Korean IT software companies developed their own multimedia products such as "Korean cuisine" and "DPRK stamps." There are joint venture companies in the DPRK that assemble computer hardware and peripheral equipment domestically (mostly on "processing for commission" terms in cooperation with the companies of Korean residents in Japan ("Chongryung") and South Korean companies. In 2001,

North Korea delivered US$ 3.35 million worth of computer hardware to the ROK and 1.2 million Swiss franks worth of similar products to Europe. The IT-related goods comprise about 10% of the DPRK-Japan trade turnover. Pyongyang also briskly trades in the IT-related goods and products with the PRC and Arab countries.

In the late 1980s, Moscow and Pyongyang began to explore scientific and technological cooperation in the IT area, including training of North Korean IT specialists in Russia and bilateral trade in computer components, including re-export operations, on a modest scale. In the 1990s, the government-to-government cooperation failed to develop on any large-scale basis because of deteriorated political relations. This notwithstanding, North Korean continued to purchase certain IT products from the Russian private sector and secured limited access to Russian information technologies and R&D results via non-governmental channels.

Political rapprochement between Moscow and Pyongyang brought about a flurry of proposals, notably from the North Korean side, aimed at furthering bilateral cooperation in joint manufacturing of computer hardware and in other IT areas. In 2002, the North Korean side proposed a dozen of detailed projects, especially in the course of the visit to Moscow by the head of the Pyongyang City Council in January, the visit to Pyongyang by the Russian President's far eastern representative Mr. Konstantin Pulikovsky in April, and the visit to the Russian Far East by the DPRK deputy prime minister in April. To be more specific, on these occasions, the Russian and North Korean counterparts discussed business plans for the joint assembly of printers and PCs (up to 500 thousand units per a year), for the joint manufacturing of up to one million computer discs, plasma

panels, up to two million units of computer monitors, keyboards, "mouses," and other peripheral utilities.

In April 2002, the "Dalincom" investment company from the Russian Far East and the DPRK Committee on Promotion of Foreign Trade signed an agreement on bilateral cooperation, which stipulated active cooperation in the telecommunication sector as a top priority. The "Dalincom" investment company is supposed to guide a number of Russian telecommunication companies such as "Telecom-Invest," "Northwest GSM," "Delta-telecom," and "Telemedium" in developing various cooperative projects in the telecommunication sector of the DPRK. One of their combined efforts is centered on completing a feasibility study regarding the construction of a fiber optic line from Vladivostok to the Rajin-Sonbong Free Economic Zone in the North.

In February 2002, in Pyongyang, official representatives of the ministries concerned from the two countries signed a bilateral Program for Cooperation in Metrology and Standards, which is important for the implementation of practical cooperation in high-tech areas.

Many North Korean researchers express considerable interest in revitalizing contacts and data exchanges with their Russian counterparts. When Kim Jong Il visited Russia in 2001, he was accompanied by the President of the DPRK Academy of Sciences, who proposed a dramatic increase in scientific and technological cooperation between the two countries. The North Korean side was particularly interested in gaining access to the latest Russian research on computer and information technologies. However, there are many obstacles facing proposed exchanges of IT personnel, IT-related data, and

enterprise-level cooperation in the IT sector. The major difficulty is lack of the required financing on both sides.

To end on a more optimistic note, the Russian government believes that there exists a great potential for productively combining the efforts of three countries, ROK, DPRK, and Russia in a multilateral format that would benefit all the interested parties. Such a trilateral cooperative approach appears to begin to generate good results in the ongoing negotiations on the construction of the trans-Korean railway. It may also bear fruit in furthering the Russian-ROK-DPRK cooperation in the IT sector.

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